

# Systematic Care Management: A Comprehensive Approach to Catastrophic Injury Management Applied to a Catastrophic Burn Injury Population—Clinical, Utilization, Economic, and Outcome Data in Support of the Model

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The new standard for successful burn care encompasses both patient survival and the burn patient's long-term quality of life. To provide optimal long-term recovery from catastrophic injuries, including catastrophic burns, an outcome-based model using a new technology called systematic care management (SCM) has been developed. SCM provides a highly organized system of management throughout the spectrum of care that provides access to outcome data, consistent oversight, broader access to expert providers, appropriate allocation of resources, and greater understanding of total costs. Data from a population of 209 workers' compensation catastrophic burn cases with a mean TBSA of 27.9% who were managed under the SCM model of care were analyzed. The data include treatment type, cost, return to work, and outcomes achieved. Mean duration of management to achieve all guaranteed outcomes was 20 months. Of the 209 injured workers, 152 (72.7%) achieved sufficient recovery to be released to return to work, of which 97 (46.8%) were both released and competitively employed. Assessment of 10 domains of functional independence indicated that 47.2% of injured workers required total assistance at initiation of SCM. However, at termination of SCM, 84% of those injured workers were fully independent in the 10 functional activities. When compared with other burn research outcome data, the results support the value of the SCM model of care. (J Burn Care Res 2010;31:692–700)

Survival from catastrophic burn injury has improved dramatically over the past 20 years, with life expectancy subsequent to acute hospitalization being similar to the general population.<sup>1,2</sup> However, the "new standard of successful burn care" is no longer just survival from the burn injury; rather, it encompasses the individual's quality of life after survival,<sup>3</sup> and such improvement in quality of life demands comprehensive staff involvement throughout the entire contin-

uum of care.<sup>4</sup> Schneider et al<sup>1</sup> further state that the ultimate goal of the burn rehabilitation phases of care is the patient's reintegration into society, including return to gainful employment. To optimize the opportunity for such outcomes, several studies<sup>3–6</sup> have concluded that, "Current data demonstrate that outcomes quality is enhanced by long-term follow-up with a multidisciplinary burn program." A more recent study<sup>7</sup> suggests that lack of long-term follow-up leads to an increase in musculoskeletal problems and that comprehensive active follow-up over a period of several years postinjury is necessary to achieve both appropriate prosthetic management and to manage emerging complications. To provide optimal long-term recovery from catastrophic injuries and medical conditions, and more specifically from catastrophic burn injuries in the manner described above, an outcome-based model using a new technology termed

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systematic care management (SCM) for coordinating care and maximizing long-term recovery has been developed by a national care management organization.<sup>8,9</sup> A catastrophic burn injury is here defined as a serious, life changing event that involves large (>20%) TBSA full- and/or partial-thickness burns, a smaller percent TBSA involving special areas (hands, face, feet, or perineum), or a high voltage electrical injury or chemical injury, and that occurs in conjunction with serious comorbid factors or severe concomitant injuries and may result in limitations and complications that last a lifetime. This article summarizes clinical, utilization, economic, and outcome data for 209 catastrophically burned patients managed through the SCM model of care. Although the sample size is relatively small when compared with other databases,<sup>10</sup> it does represent the entire set of workers' compensation catastrophic burn patients referred for SCM by multiple workers' compensation carriers. In addition, unlike the National Burn Repository (NBR) database, this data set covers the patients from the date of burn through long-term rehabilitation and return to work, when possible. The population represents all burn cases managed between January 1, 1999, and September 30, 2007, with a mean duration of 20 months and with a mean TBSA of 27.9% (range = 1–92%).

## METHOD

### SCM Model

SCM comprises four components:

- comprehensive, integrated acute and chronic clinical and financial data capture and analysis, termed complexity level;
- empirically derived, physician expert-driven, "management" approaches, and risk adjustment based on diagnosis-specific empirically derived algorithms;
- creation of a systematic case-specific long-term care plan with guaranteed case-specific and global functional outcomes;
- a fixed case-specific rate for the comprehensive care management plan, called the "outcome plan (OP)."

The SCM model creates a "virtual" comprehensive burn care team that monitors and coordinates care delivery for each catastrophically burned patient from the date of injury until specific guaranteed outcomes and optimal recovery have been achieved. It also provides an accurate projection of needed care pathways; a direction to patients and their families to access the highest quality burn care programs; a comprehensive

approach to addressing clinical, psychological, and social sequelae resulting from burn injury; a proactive management of problems and complications to minimize deviation from the recovery process; and a systematic means for ensuring that all the components of care are delivered efficiently throughout the entire plan of care.<sup>8</sup>

Once the OP contract has been developed, it is then offered to the workers' compensation carrier for a set price. On approval of this plan by the carrier, the SCM program assumes risk for all compensable medical costs. From the date of the initial referral and continuing through completion of all outcomes, termed length of contract, the SCM team works closely with the treating professionals to optimize recovery and to maximize the injured worker's total outcome.

### Subjects

Retrospective data from 209 patients who had sustained work-related catastrophic burns and who were managed under the SCM model were analyzed. Electronic data extraction was used and included identifying information, primary and secondary diagnoses, key clinical data, targeted global outcome levels, return to work status, complexity levels, length of inpatient stays (acute burn unit and acute rehabilitation), and costs incurred to achieve the targeted outcomes. All 209 patients had completed their OPs before data extraction.

## RESULTS

The population consisted of 202 males (97%) and 7 females (3%) in 38 states with a mean age of 38 years. A comparison of the SCM population with the combined workers' compensation and group health database of the NBR indicates that the SCM population is substantially more severely burned than that of the NBR population, with 69.9% of the SCM group having 31% or greater TBSA compared with 5.4% of the NBR group (Table 1). Fifty-three percent were married at the time of injury; 48% were high school graduates; 85% were fluent in English; and 76% were

Table 1. Percent TBSA by data source

Percent TBSA	National Burn Repository 2009 (%)	SCM (%)
<30	94.6	30.1
31–49	3.8	20.7
>50	1.6	49.2

SCM, systematic care management.

working in either manual labor or skilled trades at the time of injury (Table 2).

The mean percent TBSA burn was 27.9% with a mean full-thickness TBSA of 18.2% and a mean TBSA of 3% for fourth-degree burns. The distribution of burns by location and by cause is shown in Tables 3 and 4. The most commonly burned areas were the hands (25.8% of patients) and the face and neck region (26.3%). Flame/heat was the most common cause of injury (57%). Another 21% (44 of 209) of patients sustained high-voltage electrical injury, whereas 10% (21 of 209) of patients were injured in chemical-related accidents. There were three frostbite injuries. Of the 209 patients, 34% had significant sec-

ondary diagnoses of amputation, acquired brain injury, spinal cord injury, chronic pain syndrome, multiple trauma, or other major illnesses in addition to their burn injury. Other significant associated injuries at the time of the burn injury included inhalation injury (19%), complex fractures (4%), peripheral nerve injuries (5%), established compartment syndrome (11%), and internal injuries (1%). An array of comorbid factors was noted, including history of cardiac disease (22%), diabetes mellitus (13%), current history of smoking (35%), hypertension (13%) and obesity with body mass index  $>29$  (40%).

The SCM Clinical Complexity Indicator ranges from 1 to 6, from least to most complex (Table 5). This is a mathematically derived multifactorial, diagnosis-specific algorithm used for classifying severity of injury relative to the expected total amount of resources needed to achieve a given outcome level (Table 6). Forty-one percent of the cases were in complexity 3 or lower, whereas 59% were in complexity 4 or higher. Complexity is also reflected in the total time it takes to complete all outcomes and close a case, with the length of the contract increasing commensurate with complexity level (Table 7).

Of the 209 patients in this sample, 100% achieved their guaranteed global outcome. Twenty-seven percent of the levels 3 and 4 patients, 57 of 209, exceeded their initial outcome level determination. All 110 cases with guaranteed level 5 outcomes achieved their predicted outcomes. Table 8 lists the outcome levels achieved by burn etiology.

The great majority, 173 of 209 patients (83%), received a release for return to work or for vocational rehabilitation. Ninety-seven patients (46.4%) were released and competitively employed, and 55 patients (26.3%) were released but unemployed at the time of contract completion (Table 9). An additional 21 patients (10%) were released for vocational rehabilitation, and 1 patient who was not released for work obtained full duty employment anyway. Release to work required formal releases for return from all physician providers whose treatment was related to the initial work-related burn injury.

A comparison of these workers' compensation burn patient return to work data to a matched sample cohort of workers' compensation burn patients from a large workers compensation industry national database indicates significantly better outcomes for the patients managed by SCM.<sup>11</sup> Excluding those released for vocational rehabilitation, the SCM data indicate a 72.7% release to return to work rate compared with a 30.4% release return to work rate for the industry sample ( $\chi^2 = 27.8$ ;  $P < .000001$ ). Similarly, SCM obtained a combined return to work rate of

**Table 2.** Demographic data

Demographics	N (%)
Age (yr; mean 38 yr)	
≤20	4 (0.02)
21–30	56 (0.27)
31–40	60 (0.29)
41–50	55 (0.26)
51–60	27 (0.13)
61–70	6 (0.03)
71–80	1 (0.00)
Education	
Attended college	11 (0.05)
Attended high school	31 (0.15)
Attended trade school	2 (0.01)
College graduate	8 (0.04)
Graduate degree	1 (0.00)
High school graduate	100 (0.48)
Less than eight years	10 (0.05)
Trade school graduate	5 (0.02)
Unknown	41 (0.20)
Managerial	2 (0.01)
Previous employment	
Manual labor/unskilled	84 (0.40)
Other (specify)	19 (0.09)
Processing	2 (0.01)
Professional	12 (0.06)
Sales	1 (0.00)
Services/nonservices	10 (0.05)
Skilled trades	77 (0.37)
Technical	2 (0.01)
Family support	
Highly supportive	163 (0.78)
Neutral	2 (0.01)
No identified family	5 (0.02)
Not supportive	2 (0.01)
Others (specify)	3 (0.01)
Somewhat supportive	34 (0.16)
Total sample size	209

Percentage is defined as the percentage of the total sample.

**Table 3.** Burn location by TBSA and total amount paid\*

TBSA	Location	N	Mean TBSA (%)	Minimum TBSA (%)	Maximum TBSA (%)	Mean Paid Amount (\$)	SD Paid Amount (\$)	Minimum Paid Amount (\$)	Maximum Paid Amount (\$)
Second and third degree	Face	38	40	5	92	816,713	817,325	56,134	4,484,198
	Foot	6	18	4	40	283,023	262,707	66,522	716,450
	Forearm	1	4	4	4	882,248	—	882,248	882,248
	Hand	55	23	1	59	353,412	371,602	41,626	1,411,571
	Neck	18	32	5	60	464,716	374,097	50,665	1,771,018
	Other	87	25	2	77	305,270	384,929	14,483	2,436,311
	Perineum/genitalia	4	38	25	55	623,484	627,571	50,422	1,209,627
Total		209	—	—	—	—	—	—	—
Full-thickness third degree	Face	33	31	2	79	808,026	859,188	56,134	4,484,198
	Foot	5	17	4	35	326,323	268,714	96,563	716,450
	Hand	51	14	1	48	349,686	371,373	41,626	1,411,571
	Neck	17	19	5	60	459,010	384,802	50,665	1,771,018
	Other	37	13	1	41	209,620	135,106	44,348	578,772
	Perineum/genitalia	4	17	6	44	623,484	627,571	50,422	1,209,627
	Total	147	—	—	—	—	—	—	—
Fourth Degree	Face	15	3	0	24	930,736	561,341	122,873	1,628,019
	Foot	3	8	1	12	460,505	275,834	168,357	716,450
	Hand	19	3	0	16	438,825	441,126	47,022	1,411,571
	Neck	8	7	0	36	371,899	227,240	50,665	688,679
	Other	30	3	0	50	225,554	261,803	44,348	1,405,311
	Perineum/genitalia	2	0	0	0	586,044	757,483	50,422	1,121,665
	Total	77	—	—	—	—	—	—	—
Overall N		209	—	—	—	—	—	—	—

\* Total amount paid includes all costs incurred during the course of the outcome plan related to inpatient hospitalization, inpatient rehabilitation, professional fees, laboratory fees, diagnostic test and radiology fees, outpatient therapies, outpatient surgical procedures, durable medical equipment, attendant care, transportation, and case management fees.

63.8% ( $\chi^2 = 13.9$ ;  $P < .00001$ ), with a return to full duty rate of 36.9% and a light duty (employment with restrictions) rate of 26.9% for those burn patients released to work. Although the industry sample had a combined return to work rate of 50%, with a full duty rate of 50% and a light duty rate of 0.0%, these percentages reflect a lower overall release to return to work rate. Outcome analysis of patients sustaining either high voltage electrical injury or chemical injury revealed a substantially lower return to work rate, 13.9 and 7.2%, respectively (reduction in return to work rate in high energy electrical burns generally reflects higher rates of amputation and neurologic dysfunction than those found in the thermal injury group). Measures of functional independence for 10 skill domains were available for all 209 subjects (Table 10). Subjects were assessed at the beginning of the OP and then again at the end of the plan. Scores for total assistance versus independent functioning were averaged across all 10 domains, with 47.2% of the subjects requiring total assistance to meet their functional needs at the beginning of the OP. By the end of the OP, only 2.4% required total assistance across the

10 domains, whereas 84% were rated as being independent (Wilcoxon;  $P < .00001$  for each domain).

Approximately 13%, 27 of 209 patients, required some attendant care (mean attendant care hours per week = 78 hours; range = 7–168 hours per week), whereas 10 of 209 patients required full-time attendant care at the end of their OPs. In addition, 145 patients required various types of durable medical equipment, with a mean total durable medical equipment cost per patient of \$3299 and an SD of \$6980.

Other clinical factors that also commonly impacted the health status of the patients included pneumonia (38%), sepsis (31%), inhalation injury (19%), adult respiratory distress syndrome (14%), and compartment syndrome (11%).

Analysis of data for total costs and length of stays by complexity level (Table 11) suggested that, with the exception of the one complexity 1 patient, the SCM complexity model accurately reflected changes in resource utilization in the manner predicted; that is, as the complexity level increased, the actual length of time in the acute setting and the time needed to complete all SCM activities (length of contract) increased

**Table 4.** Complexity by burn etiology by TBSA by total amount paid\*

Complexity Score	Burn Etiology	N	TBSA Second and Third Degree	TBSA Third Degree Full Thickness	Fourth Degree	Total Paid Amount (\$)			
			(Mean, %)	(Mean, %)	(Mean, %)	Mean	SD	Minimum	Maximum
1	Flame/heat	1	20	—	—	98,405	—	98,405	98,405
	Total	1	20	—	—	98,405	—	98,405	98,405
2	Electrical	4	20	18	0	169,755	83,316	66,522	254,566
	Flame/heat	19	15	7	0	85,545	38,574	29,400	181,015
3	Other (specify)	2	19	—	—	47,574	46,798	14,483	80,665
	Total	25	16	8	0	95,981	57,127	14,483	254,566
3	Chemical	4	16	5	0	135,488	62,963	93,282	227,400
	Electrical	4	8	2	1	159,558	94,694	52,868	280,591
3	Flame/heat	37	21	11	0	144,894	81,767	41,626	383,239
	Other (specify)	15	19	10	0	119,998	92,082	50,422	414,698
4	Total	60	19	10	0	139,021	83,019	41,626	414,698
	Chemical	8	35	19	0	346,489	186,286	153,536	731,397
4	Electrical	17	20	11	4	352,833	395,365	89,054	1,771,018
	Flame/heat	24	30	21	0	396,943	325,497	71,490	1,411,571
4	Other (specify)	2	43	23	0	314,912	271,584	122,873	506,950
	Total	51	28	17	2	371,108	325,188	71,490	1,771,018
5	Chemical	6	37	21	0	507,209	377,886	112,223	1,209,627
	Electrical	13	27	22	10	482,767	265,785	106,237	985,028
5	Flame/heat	19	33	25	3	620,006	450,451	146,398	1,815,256
	Frostbite	1	50	—	0	1,384,735	—	1,384,735	1,384,735
5	Other (specify)	3	31	21	—	866,005	420,758	578,772	1,348,974
	Total	42	32	23	6	597,193	402,242	106,237	1,815,256
6	Chemical	3	38	31	0	1,024,250	138,880	881,013	1,158,319
	Electrical	7	26	18	13	1,038,877	448,123	509,409	1,628,019
6	Flame/heat	19	55	45	6	1,305,833	927,248	210,716	4,484,198
	Frostbite	1	30	30	17	466,945	—	466,945	466,945
6	Total	30	46	37	9	1,187,422	782,116	210,716	4,484,198
	Chemical	21	32	19	0	449,041	353,389	93,282	1,209,627
Overall	Electrical	45	22	15	7	463,634	422,289	52,868	1,771,018
	Flame/heat	119	29	20	2	447,079	599,835	29,400	4,484,198
Overall	Frostbite	2	40	30	9	925,840	648,976	466,945	1,384,735
	Other (specify)	22	23	13	0	232,862	310,495	14,483	1,348,974
	Total	209	27	18	3	432,873	522,037	14,483	4,484,198

\* Total amount paid includes all costs incurred during the course of the outcome plan related to inpatient hospitalization, inpatient rehabilitation, professional fees, laboratory fees, diagnostic test and radiology fees, outpatient therapies, outpatient surgical procedures, durable medical equipment, attendant care, transportation, and case management fees.

as did the total amount paid for all injury-related costs throughout the contract period.

## DISCUSSION

The goal of total burn care is the optimal restoration, rehabilitation, and reintegration of the patient into society, including a return to gainful employment. This report describes the clinical experience of a national catastrophic care management organization in coordinating the care of a large group of burned workers using an established, proprietary technology of care management called SCM. This methodology has been developed, applied, and refined over nearly

two decades by a health systems management company specializing in complex clinical conditions such as spinal cord injuries, traumatic brain injuries, and major burns and has also been applied effectively in other nonworkers' compensation populations including Medicaid, Medicare, and Group Health.

SCM was developed as an alternative to current managed care approaches for managing the most complex medical challenges such as catastrophic burns. The model provides a comprehensive projection of anticipated care pathways and the clinical results expected for each individual patient. By adopting the philosophy that "the best care is often the most economical," it encourages access to the most

**Table 5.** SCM complexity levels\*

1	Minimal treatment: only a few treatments; clearly defined endpoints to treatment
2	Routine treatment: multiple treatments, but not extensive; clearly defined endpoints to treatment
3	Low intensity treatment: injured worker is complex, has requirement for full medical, surgical, and rehabilitative treatment, but without any indicators of prolonged treatment or delayed recovery
4	High intensity treatment: injured worker is complex, has requirement for full medical, surgical, and rehabilitative treatment, but also has some elements that indicate the need for prolonged treatment or delayed recovery
5	Severe injured worker is unusually complex (to stay consistent with items 3, 4, and 6) and requires an extraordinary amount and duration of treatment; treatment endpoints are unclear and difficult to obtain
6	Extremely severe: the injured worker is among the most complex, requires the highest amount and duration of treatment; treatment endpoints are highly unpredictable, problematic, and at risk of nonachievement

\* Complexity is a mathematically derived, diagnosis-specific formula used to predict resource utilization and risk adjustment.

SCM, systematic care management.

expert providers who can address all appropriate clinical, psychological, and social issues, whereas in traditional managed care organizations, physicians are frequently confronted with increased demands to justify complex clinical decisions to inexpert payer intermediaries. The model emphasizes proactive management in all the phases of care. Although some aspects of burn care incorporate evidence-based medicine, many issues lack sufficient research to allow implementation of such templates. To compensate for this, SCM implements rapid response to complications by facilitating physician specialist intervention as needed. SCM also allows for the identification of variations in care across the United States and associates them with outcomes and costs.<sup>12</sup>

The SCM model uses a highly organized, comprehensive, patient-oriented, formal management structure in which the treating physician interacts directly with a peer, an independent, experienced, consultant burn physician. This model capitalizes on both the SCM physician's ability to assess the care delivered in each case and the capture and analysis of large clinical and economic data sets that incorporate the treatment patterns and outcomes of multiple providers. The net result is the ability to integrate a large long-term data set with clinical and economic outcomes

**Table 6.** SCM global outcomes levels

Level 0: Physiologic instability	Physiologic instability encompasses injured workers who have unresolved or unmanaged acute major diagnostic or treatment requirements
Level I: Physiologic stability	Routine treatment: multiple treatments, but not extensive; clearly defined endpoints to treatment
Level II: Physiologic maintenance	Low intensity treatment: injured worker is complex, has requirement for full medical, surgical, and rehabilitative treatment, but without any indicators of prolonged treatment or delayed recovery
Level III: Residential integration	Residential integration encompasses the rehabilitation and treatment necessary to allow the injured worker to reasonably and safely function in the residential setting appropriate for that injured worker's physical and cognitive capabilities and long-term domicile conditions
Level IV: Community integration	Community integration focuses on achievement of the advanced rehabilitation outcomes necessary to achieve an appropriate level of function within the injured worker's community
Level V: Capacity for return to work	Capacity for return to work refers to establishing the injured workers as ready to work at a competitive level within their physical, functional, and/or cognitive capabilities

SCM, systematic care management.

and to apply this data in the development of meaningful projections of clinical needs and costs. In addition to the burn surgeon, the SCM team consists of an expert onsite nurse case manager who interfaces directly with the patient, family and providers, and other individuals who provide administrative and data management. The team meets at regular intervals throughout the course of the OP to assess patient's

**Table 7.** Length of contracts

Complexity Level	Length of Contracts (d)				
	n	Mean	SD	Minimum	Maximum
1	1	169	—	169	169
2	25	373	211	162	938
3	60	383	184	154	878
4	51	673	357	232	1913
5	42	722	325	275	1440
6	30	837	316	377	1683

**Table 8.** Number and percent of outcome level achieved by burn etiology

Burn Etiology	Achieved Outcome Level (N = 209)	
	Level IV, n (%)	Level V, n (%)
Flame/heat	15 (7.10)	103 (49.20)
Electrical	15 (7.20)	29 (13.90)
Chemical	6 (2.80)	15 (7.20)
Frostbite	2 (1.00)	0 (0.00)
Other	3 (1.40)	21 (10.00)

progress, document achievement of outcomes, and address any problems that are interfering with the patient's progress. Consistent execution of the care management plan ensures that no significant clinical issue is overlooked. The plan facilitates communication among providers and ensures that appropriate resources are provided to the patient when needed.

Another key element of SCM is the development of a fixed case-specific payment rate for the OP, one that requires all patient-specific clinical outcomes be achieved before the SCM program can close the case. This OP contract is presented in detail to the workers' compensation insurance carrier in a formal conference, so that the carrier clearly understands the nature of the patient's injuries and the scope of the care and the projected length of time that will be required to achieve the outcomes. This financial structure ensures that the quality and breadth of care do not become victims of cost-cutting measures.

The data in this report are derived from a large group of burned workers and are unique in several ways. The demographics of the study population vary from general reports of burn outcomes as they include only injured workers. The patients were almost universally male (97%) with a mean age of 38 years, a

mean burn size of 27.9%, and a mean full-thickness burn TBSA of 18.2%. By contrast, the most recent American Burn Association NBR 2009 report<sup>10</sup> indicates that 65% of burns reported to the NBR occurred at home, with a 71% male preponderance, a mean age of 32 years, and with 67% of reported cases having burns of less than 10% TBSA. Thus, the total %TBSA and depth of burn in this report are considerably higher than those seen in the general population. The cause of burn injuries in this group also differs from that seen in the general population with 56% flame-heat injuries, 21% high voltage electrical injuries, and 10% chemical injuries vs 70% flame-heat etiology in the general population. In addition, these patients were all covered under workers' compensation insurance, which may have had an impact on both care delivery owing to regulations and payment rules that vary from state to state and in the actual choice by the carrier to refer the injured worker for SCM with its guaranteed outcomes and likely reduction in future long-term medical costs. Nonetheless, the care rendered to these patients was based on the fundamental requirement that it be appropriate and "medically necessary," without any restrictions secondary to financial limitations.

Other important features of these data are the inclusion of treatment, cost, and return to work information and a comparison of the initial complexity level with the associated combined acute inpatient and rehabilitation care and total costs. The data capture all sites and providers of care delivery, and they provide a comprehensive record of the outcome levels, the costs associated with achieving actual outcomes, and the return to work rates (Tables 8 and 9).

## CONCLUSION

SCM provides an organized system for the management of complex patient care and recovery through-

**Table 9.** Full SCM sample vs control (industry match)—excluding vocational rehabilitation

Return to Work Status	SCM, n (%)	Control (Industry Match Sample), n (%)	Persons $\chi^2$	P (1 Tailed)	CL (95% 1 Tailed)
Released, competitively employed without restrictions	56 (30)	7 (15)	2.1296	.07224	(0.0019, 1)
Released, competitively employed with restrictions	41 (22)	0 (0)	—	—	—
Release employed total	97 (52)	7 (15)	13.9265	.00001	(0.1947, 1)
Released, not competitively employed	55 (29)	7 (15)	1.9565	.08094	(0.0028, 1)
Release not employed total	55 (29)	7 (15)	6.746	.004698	(0.0953, 1)
Overall released to RTW total	152 (81)	14 (30)	27.8484	.000001	(0.2871, 1)
Not released, but competitively employed	1 (1)	0 (0)	—	—	—
Not released, not competitively employed	35 (19)	32 (19)	—	—	—
Overall sample size (N)	188 (100)	46	—	—	—

SCM, systematic care management; RTW, return to work.

**Table 10.** Fim-Fam comparison between start and end of contract

Fim Category	Level of Assistance	Beginning of Outcome Plan, n (%)	End of Outcome Plan, n (%)	Wilcoxon Statistic	P
Self-care	Total Assistance	109 (52)	4 (2)	799	.00001
	Independent	7 (3)	158 (76)		
Cognition	Total Assistance	73 (35)	3 (1)	6,124	.00001
	Independent	62 (30)	188 (90)		
Communication	Total Assistance	66 (35)	4 (2)	7,670	.00001
	Independent	75 (36)	193 (92)		
Bladder management	Total Assistance	93 (45)	4 (2)	6,216	.00001
	Independent	60 (29)	193 (92)		
Bowel management	Total Assistance	93 (45)	5 (2)	6,383	.00001
	Independent	60 (29)	195 (93)		
Behavior	Total Assistance	96 (46)	5 (2)	3,395	.00001
	Independent	21 (10)	160 (77)		
Safety	Total Assistance	70 (33)	3 (1)	3,907	.00001
	Independent	35 (17)	182 (87)		
Mobility cap	Total Assistance	96 (46)	7 (3)	2,025	.00001
	Independent	37 (18)	179 (86)		
Household management	Total Assistance	144 (69)	7 (3)	1,362	.00001
	Independent	11 (5)	142 (68)		
Community reintegration	Total Assistance	148 (71)	10 (6)	2,228	.00001
	Independent	16 (8)	166 (79)		
Overall N		209			

\* Group-wise test done with match pair Wilcoxon rank sum test with continuity correction at 95% CL. P-value < 0.05 is statistically significant.

† McNemar test with continuity correction was also performed but showed no statistical difference at the 95% CL for self-care, household management, and community reintegration.

out the spectrum of burn care by providing access to outcome data, consistent oversight, broader access to expert providers, appropriate allocation of resources, and a greater understanding of total costs. The system uses a synergistic, commensal relationship among payer, provider, and patient to achieve optimal, cost-effective outcomes. By establishing realistic OPs with solid data-based budgets from the beginning, SCM provides the foundation for treatment that focuses on

strategies and actions that will facilitate a return to work in a high percentage of patients. The authors believe that this model should have widespread applicability beyond workers' compensation for conditions that are complex and costly and transpire over significant periods of time (for example, premature neonates, end of life care, and complex cancers).<sup>13–15</sup> With the evolution of health care reforms and the health care system, it will be increasingly recognized

**Table 11.** Complexity by combined acute inpatient and rehabilitation

Complexity Score	N	LOS (d)		LOC (d)		Total Paid Amount (\$)*			
		Mean	SD	Mean	SD	Mean	SD	Minimum	Maximum
1	1	10	—	169	—	98,405	—	98,405	98,405
2	25	14	6	373	211	95,981	57,127	14,483	254,566
3	60	17	8	383	184	139,021	83,019	41,626	414,698
4	51	37	21	673	357	371,108	325,188	71,490	1,771,018
5	42	51	29	722	325	597,193	402,242	106,237	1,815,256
6	30	83	58	837	316	1,187,422	782,116	210,716	4,484,198
Total	209	38	36	585	336	432,873	522,037	14,483	4,484,198

\* Total amount paid includes all costs incurred during the course of the outcome plan related to inpatient hospitalization, inpatient rehabilitation, professional fees, laboratory fees, diagnostic test and radiology fees, outpatient therapies, outpatient surgical procedures, durable medical equipment, attendant care, transportation, and case management fees.

LOS, length of stay; LOC, length of contract.

that decisions made early on have important consequences for downstream outcomes and costs. An integrated systematic management process that focuses on health outcomes with the implied cost savings will be seen as an increasingly valuable addition to the health management enterprise.

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